

DOCUMENT RESUME

ED 122 589

FL 006 671

AUTHOR Barik, Henri; And Others
TITLE Immersion Classes in an English Setting: One Way for
les Anglais to Learn French. Working Papers on
Bilingualism, No. 2.
INSTITUTION Ontario Inst. for Studies in Education, Toronto.
Bilingual Education Project.
PUB DATE Mar 74
NOTE 20p.; For related documents, see FL 006 670-674
EDRS PRICE MF-\$0.83 HC-\$1.67 Plus Postage.
DESCRIPTORS Arithmetic; *Basic Skills; Bilingualism; Cognitive
Processes; English; *French; Language Instruction;
Language of Instruction; Language Proficiency;
*Language Programs; *Language Skills; Prereading
Experience; Primary Education; *Program Evaluation;
Psycholinguistics; Second Language Learning
IDENTIFIERS *Immersion Programs; Ontario (Toronto)

ABSTRACT

The results of the evaluation of the French immersion program at a school in a unilingual English environment are described. A battery of tests was administered to a random sample of children from the kindergarten and grade one experimental French immersion classes and to a comparison group composed of children following the regular English program. At both grade levels, there was no evidence of a treatment effect on cognitive development. Results of testing numerical and English pre-reading skills indicate that immersion children are as ready to enter an English grade one as are regular program pupils. Although the grade one immersion children are somewhat behind the comparison group in the English language skills tested, they do show some ability to transfer reading skills from French to English. The results for the two groups in arithmetic skills tested in English indicate that immersion children can also transfer mathematical knowledge successfully from French into English. Both kindergarten and grade one immersion children show a greater comprehension of French than children of the same grade levels who receive instruction in French as a second language in a regular English program. The grade one immersion children however do not show the same level of proficiency in French as native French-speaking peers. (Author/CLK)

* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *

ED122589

ABSTRACT

Immersion Classes in an English Setting: One Way
For Les Anglais to Learn French

H.C. Barik, M. Swain & K. McTavish

The results of the evaluation of the French immersion program at a school in a unilingual English environment are described. A battery of tests was administered to a random sample of children from the kindergarten and grade one experimental French immersion classes and to a comparison group composed of children following the regular English program. At both grade levels, there was no evidence of a treatment effect (immersion versus regular program) on cognitive development (IQ). The results of testing numerical and English pre-reading skills indicate that the French immersion children are as ready to enter an English grade one as are the pupils in the English kindergarten. Although the grade one immersion children are somewhat behind the comparison group in the English language skills tested, they do show some ability to transfer reading skills from French to English.

The results for the two groups in arithmetic skills tested in English indicate that the French immersion children can also transfer mathematical knowledge successfully from French into English. Both kindergarten and grade one immersion children show a greater comprehension of French than children of the same grade levels who receive instruction in French as a second language in a regular English program. The grade one immersion children, however, do not show the same level of proficiency in French as native French-speaking peers.

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

PERMISSION TO REPRODUCE THIS COPY-
RIGHTED MATERIAL HAS BEEN GRANTED BY

Ontario Institute for
Studies in Education

TO ERIC AND ORGANIZATIONS OPERATING
UNDER AGREEMENTS WITH THE NATIONAL IN-
STITUTE OF EDUCATION. FURTHER REPRO-
DUCTION OUTSIDE THE ERIC SYSTEM RE-
QUIRES PERMISSION OF THE COPYRIGHT
OWNER.

FL006671

Immersion Classes in an English Setting: One Way
For Les Anglais to Learn French¹

H.C. Barik, M. Swain & K. McTavish

INTRODUCTION

The increasing emphasis in Canadian society on bilingualism has led to the establishment in a number of communities of various experimental programs in bilingual education, the goal of which is to produce fluently or functionally bilingual speakers. The French immersion classes at Allenby Public School in Toronto are an example of such a program.

The Allenby program is modeled after the one established in 1965 in St. Lambert, a suburb of Montreal, which begins at the kindergarten level, with English-speaking children being taught the entire curriculum in French (Lambert and Tucker, 1972). In contrast to the bilingual milieu which prevails in Montreal, however, Allenby School is located in a unilingual English environment, so that contact with the French language is basically limited to the school situation.

DESCRIPTION OF THE PROGRAM

The Allenby French immersion program was started in September 1971, with two kindergarten classes. In September 1972, immersion classes at the grade one level were begun, and the kindergarten program was continued. In all instances the teachers are native speakers of French (of European or French Canadian background), and the curriculum is the same as in the regular school program, but all instruction is in French. (English Language Arts are introduced in grade two only, for one hour per day. Subsequently, the amount of English instruction is to be increased gradually, until approximately half of the curriculum is taught in French and half in English.)

At the kindergarten level, the teacher addresses her pupils only in French, although the children continue using English in their spontaneous speech throughout most of the year. The teacher does, however, encourage the children to use more and more French as the year progresses.

In grade one French continues to be the only language of instruction. This means that the children first learn to read and write in French, their second language. They increasingly use French whenever they speak to the

teacher and frequently converse among themselves in French. By the end of grade one, French is clearly established as the language of the classroom. Thus the term "French immersion" is a more appropriate description at this stage than at the kindergarten level.

This report is concerned with the Spring 1973 evaluation of the French immersion program at Allenby Public School which included kindergarten and grade one classes. The evaluation, undertaken by the Bilingual Education Project at the Ontario Institute for Studies in Education, takes a longitudinal approach so that as far as possible the same children are studied each year as they progress through the experimental program.

The pupils at Allenby School, it may be pointed out, come generally from an upper middle class socioeconomic background.

EVALUATION

The evaluation focuses on the two basic questions which are asked of immersion programs: 1) Does instruction of the prescribed curriculum through the medium of a second language (French) have any harmful effects on native language (English) skills, on achievement in such basic academic skills as reading and arithmetic, or on the pupil's IQ and general cognitive development? 2) How beneficial is the French immersion program with regard to proficiency in French when compared with the regular school program in which French is taught as a subject and all other instruction is in English?

To investigate these questions, a battery of tests was administered to a sample of pupils in kindergarten and grade one over a six-week period in May and June 1973. The samples were composed as follows:

a) Kindergarten sample

The French immersion sample was chosen by randomly selecting 12 pupils from each of the two immersion classes. The comparison sample consisted of two groups of 12 pupils randomly selected from the regular English kindergarten program. Pupils whose native language was not English and who were judged by their teacher to have too poor a command of the language to be tested were excluded from the sample, as was any child with hearing, perceptual or related problems. The proportion of boys and girls in each group was retained, resulting in samples containing approximately the same number of boys and girls.

b) Grade One sample

The French immersion sample consisted of a randomly selected group of 15 pupils from each of the two grade one French immersion classes. The comparison sample likewise consisted of a randomly selected group of 15 pupils from each of the two regular English grade one classes. The total sample for both the immersion and the regular groups each included an approximately equal number of boys and girls. For each class, there was a list of randomly selected replacements, who filled in for a complete test for any pupil in the original sample who was absent at the first sitting of a test.

The tests administered to kindergarten were the same as those given the previous year, while a higher level of the same series was administered wherever possible to grade one. The tests were the same as those employed in the evaluation of the immersion programs in public schools in the federal capital area (Ottawa), so that a comparison can be made with schools in a different milieu where there is more opportunity for contact with the French language and culture. (See Barik, McTavish and Swain, 1973).

Testing was carried out in a separate room set up specifically for this purpose. For the kindergarten children, the sessions were never more than 30 minutes in length. In the case of grade one, any sessions over 30 minutes included a break during which the children played a short game before continuing. Never more than one testing session was given in a morning or an afternoon.

Two female testers were present at each session, one to give test instructions and read the directions for each item, and the other to ensure that children were responding as directed. For the tests in English, the directions were given alternately by both testers who were native speakers of English, whereas for the tests in French the directions were given by one of the testers only, who was a native speaker of French but fluently bilingual.

KINDERGARTEN TESTS AND RESULTS

As in 1972, the battery of tests completed by the kindergarten children consisted of four tests, each of a pictorial nature. The results are summarized in Tables 1 and 2.

1. Otis-Lennon Mental Ability Test (Primary 1 Level, Form J)

This general intelligence test measures the pupil's facility in reasoning and in dealing abstractly with verbal, symbolic and figural materials covering a broad range of cognitive abilities. Taking age into consideration, raw scores are converted into standardized Deviation IQ scores, which provide an index of mental ability.

Because the Spring 1972 results of the Otis-Lennon test showed a statistically significant difference in favour of the kindergarten immersion group over the regular group (unpublished data), it was suggested that the difference must mean either that the children enrolling in the immersion program that year were a brighter group or that the experience of the French immersion program was more enriching. In order to resolve this issue it was considered necessary to obtain a measure of IQ at the beginning of the 1972-73 academic year in the kindergarten classes.

Consequently, the Otis-Lennon Mental Ability Test was administered to all kindergarten children in both the immersion and regular classes at the start of December 1972.² The results shown in Table 1 (DIQ 1972) are based only on those pupils who were also included in the random sample of the 1973 Spring testing session, whether in the original selection of pupils or as replacements. As can be seen, although the mean DIQ is slightly higher for the immersion group (108.6) than for the regular group (105.2), the difference is not statistically significant.

When the Otis-Lennon test was administered again during the Spring 1973 testing session, the difference between the two group means was greater (114.5 vs. 107.8), but still not statistically significant. The analysis also reveals that when the effect of beginning-of-year DIQ score (1972) is eliminated through analysis of covariance, the two groups still show no significant difference in end-of-year DIQ (1973). Thus, spending a year in a French immersion kindergarten does not appear to have a significant effect on mental ability. This finding justifies the use of the 1973 DIQ scores as a covariate along with age, in the analysis of other test results. A similar conclusion was reached from the data obtained for the kindergarten classes in the federal capital area.

In comparison with American population norms, the 1973 DIQ mean for the immersion group at Allenby (114.5) falls at the 82nd percentile and that for the regular group (107.8) at the 69th percentile.

2. Metropolitan Readiness Test (Form A)

The Metropolitan Readiness Test (MRT) is designed to measure the child's readiness for school work in grade one. The six sections of the test are: word meaning, a picture vocabulary test; listening, a test of phrases and sentence comprehension; matching, a test of visual perception involving the recognition of similarities; alphabet, a test of ability to recognize lower-case letters of the alphabet; numbers, a test of number knowledge; and copying, a test of visual perception and motor control.

Considering the total scores on the test (see Table 1)³, the mean of the immersion group is significantly higher than the mean of the regular group ($p < .01$). However, when the means are adjusted for differences in age and mental ability using analysis of covariance, the difference between the two groups is no longer statistically significant. Thus it may be concluded that the performance of the two groups on the test is similar.

In terms of subtests, the groups differ significantly with respect to matching and numbers, but only in the former case does the difference remain significant ($p = .01$) when scores are adjusted for age and DIQ. The findings on the MRT are in relatively good agreement with those from the previous year, which showed no statistically significant difference on any of the adjusted means for the subtests. The same is true of the immersion and regular groups tested in the federal capital area, both this year and last.

The percentile rank associated with the total mean score on the test for the immersion group is 69 and for the regular group 46.

The MRT results suggest that children who have spent a year in a French immersion kindergarten are as ready to enter an English grade one as are those children who have attended a regular English kindergarten class.

3. Stanford Early School Achievement Test (Level 1)

The Stanford Early School Achievement Test (SESAT) is designed to provide a measure of the child's cognitive abilities, and consists of four parts. The first section, the environment, measures the degree of information the child has about his natural and social environments. The second section, mathematics, aims at measuring the development of numerical concepts learned from general experience rather than from direct intervention

through teaching. The third section, letters and sounds, measures both the ability to recognize upper- and lower-case letters and the auditory perception of beginning sounds in English. The fourth section, aural comprehension, measures the child's ability to pay attention to, interpret, infer and retain what has been heard.

The immersion group scores slightly higher on the test than the regular group (Table 1) but the difference is not statistically significant, either in the case of unadjusted or adjusted means. Neither are any of the differences on the subtests significant, a result which was also found in the federal capital area.

The immersion group mean (97.3) falls at the 60th percentile and the regular group mean (94.8) at the 56th percentile.

Thus it can be concluded that the pupils in the French immersion kindergarten are doing as well as the pupils in the regular English kindergarten in all areas tested in English, even though English is not their language of instruction.

4. French Comprehension Test - Kindergarten Level

The French Comprehension Test (FCT), still in experimental form, is a test developed by the Bilingual Education Project to measure the child's comprehension of French, since there are at present no published tests of French as a second language which are suitable for use in the early immersion classes. The present kindergarten level was adapted from the 1972 version of the test which was devised primarily with kindergarten children in mind but was also given to some grade one pupils in 1972.

The FCT consists of four parts. The first, vocabulary, requires the child to identify the picture referred to by a spoken French word. The second, phrases, requires the child to choose the picture which illustrates a spoken French phrase or sentence. The third presents oral questions, for which the child must find the correct pictorial answer. The fourth, stories, requires the child to choose the correct pictures in answer to questions based on short stories read aloud in French.

An English translation of the test was given to the sample of pupils in one of the regular English kindergarten classes to determine the extent to which the concepts involved in the test items were known to the children. Thus performance on the French version of the test could be judged

accordingly. As shown in Table 2, the total mean score of the sample taking the FCT in English is high (56.33), though not perfect. When this result is compared with the mean score of the French immersion group taking the FCT in French (39.58), the difference is highly significant, whether or not adjustments are made for age and DIQ ($p < .001$). The results on the subtests are interesting. Both the unadjusted and adjusted scores show the differences to be statistically significant on the vocabulary, phrases and questions sections but not on the stories section. In effect this means that the kindergarten children in the French immersion program can understand simple short stories as well in French as their counterparts in the regular program do in English. The same finding, it may be pointed out, emerged in the analysis of the results in the federal capital area.

As a measure of comparison, the mean score on the test of the Allenby immersion group (39.58) is slightly lower than that of the French immersion kindergarten pupils in the federal capital area (42.96), a finding which was also observed in 1972. This may be attributable to the differences in the two milieus, children in the federal capital area having the possibility of more contact with French outside the school than is the case in Toronto. The Allenby immersion group, however, does much better on the test than kindergarten pupils in the regular English program in Ottawa who receive daily periods of 20-30 minutes of instruction in French as a second language and who obtain an average score of 24.12 on the test.

GRADE ONE TESTS AND RESULTS

Five tests were administered at the grade one level. The results are presented in Table 3.

1. Otis-Lennon Mental Ability Test (Elementary 1 Level, Form J)

This is the appropriate level for grade one of the mental ability test given in kindergarten. Test items of a pictorial nature are concerned with the mental processes of classification, following of directions, quantitative reasoning, comprehension of verbal concepts, and reasoning analogy.

It was mentioned in the discussion of the kindergarten results that the mean DIQ of the children who were in the immersion kindergarten in 1972 was significantly higher ($p < .01$) than that of the children in the regular English kindergarten. By the end of grade one (DIQ 1973, Table 3), the

difference between the two groups (116.3 vs. 109.5) is no longer statistically significant, though it comes quite close to being so ($p = .08$). This change is attributable in part to the fact that the composition of the grade one samples is not quite the same as that of the previous year's kindergarten samples, since there were some changes in the student population from one year to the next and in grade one only a random sample of the pupils were tested, whereas the previous year all kindergarten pupils were included in the testing program. If only pupils having both 1972 (end of kindergarten) and 1973 (end of grade one) DIQ scores are considered, a reanalysis of the data once again shows the 1972 DIQ score of such immersion pupils to be significantly greater than that of regular pupils ($p = .01$), and to remain very nearly so at the end of grade one ($p = .06$). For these pupils, the average DIQ score increases by 5.5 points from the end of kindergarten to the end of grade one on the immersion side (from 111.3 to 116.8) and by 6.7 points in the regular program (from 102.3 to 109.0). The difference in increase of 1.2 points between the two groups is obviously not significant from an educational standpoint. Thus it may be concluded that in the course of grade one the level of cognitive development of the children is not differentially affected by the type of program (immersion vs. regular) in which the children are enrolled.

From the above discussion, it would thus appear that the lack of a significant difference in IQ between the two groups of pupils tested at the end of grade one, as contrasted with the significant difference observed the previous year at the end of kindergarten, is attributable in large part to the difference in composition of the samples at these two periods of testing rather than to a possible negative effect of the immersion experience in the course of the grade one year for pupils enrolled in such a program vis-à-vis pupils in the regular program.

In terms of American population norms, the mean score of the total immersion group (116.3) falls at the 84th percentile and that of the regular group (109.5) at the 72nd percentile.

2. Metropolitan Achievement Test (Primary I Battery, Form A)

The Metropolitan Achievement Test (MAT) is the appropriate test for grade one in the same series as the Metropolitan Readiness Test. There are four sections concerned with the reading and arithmetic skills taught in grade one. The first section, word knowledge, measures the child's

sight vocabulary, or word recognition ability in English. The child must select the proper word which refers to a given picture from four alternatives. The second section, word discrimination, measures the child's ability to select an orally presented English word from four alternative printed words bearing certain sound similarities, thus requiring both auditory and visual discrimination. The third section, reading, measures the child's reading comprehension of sentences and paragraphs in English. The fourth section, arithmetic concepts and skills, provides a comprehensive measure of the child's mastery of basic numerical and quantitative concepts, his ability to solve verbal problems, and his ability to perform addition and subtraction exercises. No reading is involved in this section.

The results of the tests are shown in Table 3. Since the first three sections involve reading in English, it is not surprising that the French immersion pupils who have had no formal training in English, do not do as well as pupils in the regular group. The differences in the adjusted scores between the two groups on all three subtests are significant at $p < .01$ or less. These results parallel those obtained in the federal capital area.

Compared with American norms, the mean scores of the Allenby immersion group fall at the 58th, 50th and 40th percentiles on these three subtests respectively, while those of the regular group fall at the 75th, 78th and 60th percentiles. Thus, even though the French immersion children have not yet learned to read in English at school, they still do better on these sections of the test than from 40 to close to 60 percent of the grade 1 school population for whom the test was developed and who were taught to read in English. It is anticipated that the ability of the children to transfer some of their reading skills from French to English without formal instruction will lead to the disappearance of the lag in English language skills once formal instruction in the English language arts is begun. This prediction is supported by the grade two results in the federal capital area, where after one year of English language arts introduced in grade two for 60 minutes per day, immersion children do as well on the English skills sections of the MAT as their peers in the regular English program.

On the arithmetic section of the MAT the two Allenby groups of children obtain approximately equivalent scores, with no significant difference between them. This section can be broken down into two parts, one composed of those items involving problem solving and the other of those involving computation. The results for the two groups are similar in both instances.

Thus it can be concluded that the grade one French immersion children mastered as much mathematical knowledge through French as the children in the English grade one did through English. The means of both groups fall at approximately the 65th - 70th percentile when compared with American norms.

The results on the arithmetic section of the test parallel those obtained with the samples in the federal capital area, which also show no difference between immersion and regular groups.

3. French Comprehension Test - Grade One Level

The grade one French Comprehension Test was developed on the basis of the version administered in 1972 with the addition of a number of new items testing different grammatical structures and concepts. The test is still in experimental form. The Grade One Level test has the same format as the Kindergarten Level test, with four parts on vocabulary, phrases, questions and stories. All items are of a pictorial nature. The number of items in the four sections, however, differ slightly in the two forms.

As with the Kindergarten Level, an English translation of the Grade One Level was given to the sample of children in one of the regular grade one classes, to determine the conceptual difficulty of the test. As shown in Table 3, children taking the test in English obtained a total mean score of 60.93 out of 65 items. The French immersion group taking the test in French obtained a total mean score of 50.47. The difference is significant at the .001 level in the case of both unadjusted and adjusted means. Similarly, a significant difference is found between the regular group taking the test in English and the immersion group taking the test in French on the vocabulary, phrases and questions parts of the test. On the stories section, however, there is no statistically significant difference. In other words, French immersion pupils taking the test in French understood and retained relatively simple short stories as well as children in the regular English program taking the test in English. Again the same results appeared in the analysis of the data for the federal capital area.

The Allenby immersion group scores approximately the same on the FCT (50.47) as the grade one immersion pupils in Ottawa (50.80) and this is so with respect to all sections of the test. In comparison, pupils

receiving 20-40 minutes of French instruction per day in the regular program in the federal capital area obtain an average score of only 24.49 on the test.

Thus children in the Allenby grade one French immersion classes reveal a satisfactory level of achievement in French comprehension when compared with children in the federal capital area.

4. Test de Rendement en Français (Grade 1 Level, 1971-72 edition)

This is a test of French achievement developed by the Commission des Ecoles Catholiques de Montréal (CECM) and standardized on a population of grade one children in Montreal whose native language is French.⁴ It involves the identification of sounds, word definition, vocabulary, spelling and sentence comprehension in French.

Only the sample of children from the French immersion classes were given this test which was administered completely in French. As shown in Table 3, the group obtained a mean score of 15.87 out of 30. In terms of norms for native French speakers, this score corresponds to a stanine of 4, indicating that the French immersion children do as well as from 23 to 39 percent of French-speaking pupils in Montreal. However, it must be pointed out that the C.E.C.M. administers the test in late March, whereas the Allenby group was tested in June, so that the norms are not quite applicable.

As for the grade one immersion pupils in Ottawa, they obtain an average score of 14.54, which is slightly lower than that of the Allenby group.

5. Test de Rendement en Mathématiques (Grade 1 Level, 1971-72 edition)

This is the mathematics achievement test used by the Commission des Ecoles Catholiques de Montréal and standardized on a French-speaking population of grade one children in Montreal. It contains items involving elementary set theory, addition and subtraction, equations, and the oral presentation of short problems.

Again, only the sample of children from the French immersion classes were given the test, which was administered completely in French. The group obtained an average score of 19.87 out of 33. In terms of population norms for native French speakers, this again corresponds to a stanine of 4, which indicates that the Allenby immersion group scores better than from 23 to 39 percent of the native French-speaking pupils in Montreal. The 2 1/2

months difference in the administration of the tests in Montreal and at Allenby again applies, however.

The Allenby score (19.87) is quite similar to that of the grade one immersion pupils in the federal capital area (19.38).

SUMMARY AND CONCLUSIONS

1. The results of the testing program carried out in Spring 1973 at the kindergarten level correspond closely to those of the previous year. The pupils at the end of the kindergarten year of an immersion program:
 - a) are as ready to enter an English grade one as are pupils who have attended an English kindergarten, as far as numerical and English pre-reading skills are concerned;
 - b) have not suffered any setback in general mental and cognitive development relative to their peers in a regular English program;
 - c) demonstrate a substantially greater comprehension of French than kindergarten pupils enrolled in a regular English program who receive 20-30 minutes a day of instruction in French as a second language.
2. The results at the grade one level are equally encouraging, and correspond closely to the results found in the federal capital area both in 1972 and 1973. The pupils in the French immersion program at the end of grade one:
 - a) are somewhat behind their English-speaking peers attending the regular English program in such basic English language skills as word recognition, word discrimination and reading. However, they still stand between the 40th and 60th percentiles, suggesting that transfer of reading skills to English has occurred even without formal instruction in English. It is, therefore, anticipated that this lag will disappear once formal instruction in English is introduced, as has been found by the end of grade two in the federal capital area;
 - b) have mastered as much mathematical knowledge via French as the pupils attending a regular English program have via English, and can transfer this knowledge from French to English;
 - c) have not suffered any setback in general mental and cognitive development relative to their peers in a regular English program;

d) although not at a par with native French-speaking peers, have achieved a level of proficiency in French far superior to their English-speaking counterparts in the federal capital area who receive 20-40 minutes per day of instruction in French as a second language.

FOOTNOTES

¹Thanks are expressed to the Principal and teachers of Allenby Public School for their cooperation in this study, and to Edna Nwanunobi for her assistance in the analysis of the data.

The research reported here is funded in part by a Grants-in-Aid for Studies in Education from the Ministry of Education of the Province of Ontario.

²It would not have been practical to administer a group test to kindergarten pupils much earlier than that. It may be assumed that the influence of the program on test performance will have been minimal at the time of testing.

³The mean scores reported in Table 1 and subsequent tables are based on the scores of all the pupils who took a particular test or subtest. Since there was some absenteeism, the numbers involved in relation to various sections of a test given in several sittings may differ (as indicated by the variation in the within-groups number of df's), which accounts for the fact that the subtest scores for any one test (e.g., MRT, SESAT) do not add up exactly to the total test score.

The number of pupils associated with any one variable is equal to the (unadjusted) within-groups number of df's plus 2. In a number of instances this resulting figure is greater than the size of the sample which was to have been tested (48 in kindergarten). In relation to age, the N in excess of sample size is due to the fact that, in calculating the average age of the groups, all pupils for whom any score was recorded, including replacements, were considered, so that the number of pupils involved in fact exceeds the predetermined sample size. Similarly, with the Otis-Lennon test administered in 1972, the N relates to all pupils involved in any part of the 1973 testing program, for whom 1972 DIQ scores were available. The other instances where N exceeds 48 result from the fact that a few additional pupils were in fact administered some of the tests. These were pupils who had filled in as replacements on one test and were inadvertently retained in the sample subsequently.

⁴Thanks are expressed to M. Guy Huot, Directeur du Bureau de l'Evaluation, Commission des Ecoles Catholiques de Montréal, for his valuable cooperation.

REFERENCES

Barik, H.C., McTavish, K. and Swain, M. Bilingual Education Project: Evaluation of the 1972-73 French Immersion Kindergarten, Grade One and Grade Two Classes in the Federal Capital's Public Schools. Toronto: The Ontario Institute for Studies in Education, 1973 (mimeo).

Lambert, W.E. & Tucker, G.R. Bilingual Education of Children. Rowley, Mass.: Newbury House, 1972.

TESTS

Kindergarten

Otis-Lennon Mental Ability Test, Primary I Level, Form J (by A.S. Otis and R.T. Lennon). New York: Harcourt, Brace & World, Inc., 1967.

Metropolitan Readiness Tests, Form A (by G.H. Hildreth, N.L. Griffiths, & M.E. McGauvran). New York: Harcourt, Brace & World, Inc., 1964.

Stanford Early School Achievement Test (by R. Madden & E.F. Gardner). New York: Harcourt, Brace, Jovanovich, Inc., 1969.

French Comprehension Test, Kindergarten (Experimental edition). Toronto: The Ontario Institute for Studies in Education, 1973.

Grade One

Otis-Lennon Mental Ability Test, Elementary I Level, Form J (by A.S. Otis & R.T. Lennon.) New York: Harcourt, Brace & World, Inc., 1967.

Metropolitan Achievement Tests, Primary I Battery, Form A. New York: Harcourt, Brace & World, Inc., 1958.

Test de Rendement en Français, 1^{re}. Montréal: La Commission des Ecoles Catholiques de Montréal, 1971-72.

Test de Rendement en Mathématiques, 1^{re}. Montréal: La Commission des Ecoles Catholiques de Montréal, 1971-72.

French Comprehension Test, Grade 1 (Experimental edition). Toronto: The Ontario Institute for Studies in Education, 1973.

TABLE 1
MEANS FOR ALLENBY KINDERGARTEN: AGE, DIQ, MRT and SESAT

	UNADJUSTED MEANS			ADJUSTED MEANS (covariates = Age + DIQ 1973)		
	Immersion	Regular	F Ratio df ^a	Immersion	Regular	F Ratio df
Chronological Age (months)	70.00	70.68	0.53 1/56			
Otis-Lennon Mental Ability Test - DIQ 1972	108.63	105.22	0.64 1/49			
Otis-Lennon Mental Ability Test - DIQ 1973	114.50	107.83	2.27 1/43			
Metropolitan Readiness Test: Total Raw Score (102 items) ^a	63.88	53.24	8.00** 1/43	59.98	56.46	1.57 1/34
i) Word Meaning (16 items)	10.84	9.71	2.25 1/47	10.11	10.29	0.12 1/37
ii) Listening (16 items)	10.20	10.75	0.71 1/47	9.86	11.05	3.29 1/37
iii) Matching (14 items)	9.08	5.61	15.25*** 1/46	8.50	6.03	7.01** 1/36
iv) Alphabet (16 items)	13.28	11.35	3.03 1/46	12.57	11.48	1.14 1/36
v) Numbers (26 items)	13.76	10.86	7.68** 1/45	13.23	11.59	2.64 1/36
vi) Copying (14 items)	6.04	5.59	0.40 1/45	5.06	6.21	3.12 1/34
Stanford Early School Achievement Test: Total Raw Score (126 items) ^a	97.28	94.80	0.37 1/43	96.28	96.44	0.00 1/33
i) Environment (42 items)	35.27	34.43	0.47 1/47	35.00	35.23	0.04 1/35
ii) Mathematics (28 items)	20.59	18.62	2.43 1/51	20.11	18.93	0.71 1/38
iii) Letters & Sounds (28 items)	20.42	18.96	0.91 1/48	20.52	18.97	1.08 1/37
iv) Aural Comprehension (28 items)	21.19	20.08	1.20 1/49	21.15	20.12	1.00 1/47

*** p < .001 ** p < .01

^a Unadjusted means based on all cases for whom relevant scores available, including cases missing covariate data; hence differences (in excess of 2) in df's between unadjusted and adjusted columns.

^a See footnote 3 of text

TABLE 2
MEANS FOR ALLENBY KINDERGARTEN : FRENCH COMPREHENSION TEST

	UNADJUSTED MEANS			ADJUSTED MEANS (covariates = Age + DIQ 1973)		
	Immersion (French Version)	Regular (English Version)	F Ratio ⁺ df ⁺	Immersion (French Version)	Regular (English Version)	F Ratio df
FCT - Kindergarten Level Total (65 items) ^a	39.58	56.33	23.76*** 1/31	38.58	61.49	62.99*** 1/23
i) Vocabulary (13 items)	9.68	12.80	15.61*** 1/33	9.37	13.74	27.40*** 1/24
ii) Phrases (30 items)	17.04	27.70	77.63*** 1/33	17.02	29.23	101.84*** 1/24
iii) Questions (10 items)	6.25	9.00	14.21*** 1/33	5.85	9.89	41.54*** 1/25
iv) Stories (12 items)	6.83	6.64	0.35 1/33	6.59	7.57	0.76 1/25

*** p < .001

+ Unadjusted means based on all cases for whom relevant scores available, including cases missing covariate data; hence differences (in excess of 2) in df's between unadjusted and adjusted columns.

a See footnote 3 of text

TABLE 3
MEANS FOR ALLENGRY GRADE ONE: AGE, DIQ and MAT

	UNADJUSTED MEANS					ADJUSTED MEANS (covariates = Age + DIQ 1973)			
	Immersion	Regular	F	Ratio	df ^b	Immersion	Regular	F	Ratio
Chronological Age (months)	82.08	82.94	0.93		1/70				
Otis-Lennon Mental Ability Test DIQ 1973	116.27	109.47	3.19		1/58				
Metropolitan Achievement Test (standard scores)									
i) Word Knowledge (22-65) ^a	30.74	35.00	4.36 [*]		1/59	49.79	55.81	10.18 ^{**}	1/55
ii) Word Discrimination (21-68) ^a	49.06	56.24	10.71 ^{**}		1/58	47.97	57.41	21.79 ^{***}	1/54
iii) Reading (20-70) ^a	46.23	50.47	3.00		1/58	45.26	51.35	6.63 ^{**}	1/55
iv) Arithmetic Concepts & Skills (18-68) ^a	31.69	31.00	0.17		1/55	31.01	31.77	0.34	1/52
French Comprehension Test	Immersion (French Version)	Regular (English Version)	F	Ratio	df ^b	Immersion (French Version)	Regular (English Version)	F	Ratio
FCT - Grade One Level Total (65 items) ^a	50.47	60.93	41.02 ^{***}		1/43	49.59	61.75	61.09 ^{***}	1/33
i) Vocabulary (10 items)	9.10	9.87	8.31 ^{**}		1/43	9.00	9.93	10.86 ^{**}	1/33
ii) Phrases (33 items)	23.77	31.60	78.77 ^{***}		1/43	23.28	32.10	115.14 ^{***}	1/33
iii) Questions (7 items)	5.47	6.80	42.79 ^{***}		1/43	5.52	6.88	59.78 ^{***}	1/33
iv) Stories (15 items)	12.13	12.67	0.57		1/43	11.79	12.85	1.90	1/33
Test de Rendement en Français Total (30 items)	15.87	-							
Test de Rendement en Mathématiques Total (33 items)	19.87	-							

*** p < .001 ** p < .01 * p < .05

^a Unadjusted means based on all cases for whom relevant scores available, including cases missing covariate data; hence differences (in excess of 2) in df's between unadjusted and adjusted columns.

^b Range of standard scores scale.

^c See footnote 3 of text.